

## CLOSURE ARRANGEMENT FOR CANS

Field of the Invention

The present invention refers to an improvement in a closure arrangement for a can obtained in metallic sheet and of the type which comprises a tubular body, with the lower edge affixing or incorporating a bottom wall, and with the upper edge carrying, directly by means of a deformed portion of the tubular body or by means of an annular upper wall portion which can take the form of a structural ring, a seat for the seating and retention of a press-fit plastic lid. The invention is particularly related to a closure arrangement with a plastic lid for a can of the type considered above and which is used to contain products of progressive consumption, such as certain food products.

Prior Art

Determined products, such as certain food products, have to be submitted to hermetic storage and provided with a clear visual indication to the consumer that the package in which they are presented to the market has not been violated. Considering that many of these products are of progressive consumption, it is indispensable that, upon the first opening of the package, the lid which gives access to the interior of the can be closed again as many times as necessary during the progressive consumption of the stored product, in order to guarantee the tightness of the re-closed can and protect the remainder of the content thereof.

There are well known in the art the cans provided with a press-fit lid, which is fitted, by pressure, in a peripheral structural ring, internal to the upper edge of the body of the can and hermetically double seamed thereto. The tightness of the content is guaranteed in

this type of construction, by the lid fitting in the seating and retention seat, which can be provided in the structural ring that defines the annular upper wall of the can or in the tubular body of the latter.

5 It is also known from Brazilian patent applications PI 0003727-3, PI 0203950-8 and PI 0303138-1, a solution in which the plastic lid comprises a sealing portion, which is removably seated and retained in the seat, and a manually breakable seal, which is disposed on  
10 and around the upper end of the tubular body of the can and connected to the sealing portion by breakable connections.

While eliminating the deficiencies of the previous lids for cans containing products of progressive consumption, these prior solutions of the same applicant still present a certain deficiency susceptible to improvement.

In the prior solutions proposed by the same applicant, the lid is mounted with its seal disposed on and  
20 around the upper end of the can body and said upper end presents a contour which is substantially equal to the cross section contour of the tubular body of the can. Thus, the lid is positioned with its seal projecting radially outwardly from the cross section  
25 contour and thus susceptible to collide with the seal of the lid of a can disposed side by side and adjacent in relation to another can.

During the packaging operations of the already filled and closed cans, and also during transportation in  
30 boxes or pallets, in which they remain contacting each other, there may occur a partial or total rupture of the seal of a lid of a can colliding with the lid of another can.

The even partial rupture of the seal will indicate to  
35 both the trader and the consumer that the content of

the can has been violated. Once the reliability as to the integrity of the content of the can has been destroyed, the already packaged product to be commercialized must be discarded.

5 Another deficiency of the known solutions results from the fact that the stacking of the cans makes the lid of a can receive, over its seal, the generally double seamed lower edge of the tubular body of a can disposed immediately above. In this arrangement, the  
10 weight of the upper cans in the stack is applied to the lower cans only along a circumferential alignment of the respective seals onto which the lower edges of the upper cans are seated. Thus, the stacking load is concentrated in a specific and restricted lid region  
15 defined on the seal. Furthermore, the seals should incorporate, preferably in their peripheral region, a small upper circumferential wall which remains external to the lower end contour of the tubular body of a can stacked over an inferior can, in order to  
20 define a stop means to avoid undue radial displacements of a can outside the vertical alignment of a stack in which it is stored.

Objects of the Invention

It is a generic object of the present invention to  
25 provide an improved closure arrangement for the type of can considered herein, which presents a simple and low cost construction, using a plastic lid provided with a reliable tamper evident seal which is positioned in order not to contact the lid of a can of  
30 the same type that is disposed laterally and adjacent to another can, guaranteeing the integrity of the seal of said lid during packaging, shipping and storage of said cans.

It is a further object of the present invention to  
35 provide an improved can closure arrangement as

mentioned above, which allows the reliable stacking of the cans without the stacking load concentrating in a specific and restricted region of the lid.

Disclosure of the Invention

- 5 The generic object defined above is attained by the provision of a can of the type which comprises: a tubular body having a closed lower end and an open upper end provided with a seat; and a lid in a single piece of plastic material, comprising a sealing portion to be removably and hermetically seated in the seat, and projecting radially outwardly from the latter; and a seal axially breakable in a region of its circumferential extension and which presents a lower skirt to be tightly seated around the upper end  
10 of the tubular body, and an upper edge internally incorporated to the sealing portion by means of breakable radial bridges which are ruptured when submitted to a certain pulling force for separating the seal from the sealing portion upon the first  
15 opening of the lid.  
20

According to the invention, the upper end of the tubular body, around which is seated the lower skirt of the seal, presents a cross section contour that is smaller than the largest cross section contour of the remainder of the tubular body, so that the contour of the lid is maintained internal to said largest cross section contour of the tubular body, avoiding the mutual contact of the lids of two adjacent cans disposed side by side.  
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- 30 The above-defined construction allows the lids to be totally protected against contacts and collisions with the lids of other adjacent cans during different operational situations in which these cans are joined in groups of at least two units, and subject to manual or mechanical handling or transportation movements.  
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Besides the technical effect mentioned above, the new construction allows the seating to occur with a better load distribution of the bottom of a can over the lid of a can disposed immediately below.

5 Brief Description of the Drawings

The invention will be described below, with reference to the enclosed drawings given by way of example of an embodiment of the invention, and in which:

Figure 1 is a perspective view of a can carrying a  
10 plastic lid in a closure arrangement, according to the  
present invention;

Figure 2 is an exploded perspective view of the can  
and the lid of figure 1, after rupturing the seal of  
the lid;

15 Figure 3 is an upper plan view of the can and of the  
plastic lid illustrated in figure 1;

Figure 4 is a partial diametrical cross-sectional view  
of both the can and the lid illustrated in figures 1-  
3, taken according to line IV-IV of figure 3; and

20 Figure 5 is a view similar to that of figure 4, but  
with the section being taken according to line V-V in  
figure 3.

Description of the Illustrated Embodiment

According to the enclosed drawings, the present  
25 closure arrangement is applied to a can made of  
metallic sheet, comprising a tubular body 10, with a  
lower end 11 affixing a bottom wall 12 and with an  
upper end 13 affixing, by a double seam 14, an annular  
30 upper wall 15 which internally defines a seat 16 for  
the hermetic seating of a lid 20. The illustrated  
tubular body 10 presents a circular cross section, it  
being understood however that said cross section might  
present other embodiments rather than the circular.

35 The construction of the annular upper wall 15 and of  
the seat 16 can be made in different manners, as long

as it allows the lid 20 to be hermetically and securely fitted in the upper part of the can. In figures 4 and 5, the construction of both the annular upper wall 15 and the seat 16 is accomplished as 5 described and claimed in Brazilian patent PI 9408643-5 granted to the same applicant in Brazil and also in other countries (for example in the United States, US 5,899,352 and in Europe, EP 0706486), therefore dispensing the detailed description thereof in the 10 present document.

According to the invention and as illustrated in the enclosed drawings, the lid 20 is preferably constructed as described in the co-pending patent application of the same applicant, filed on July 24, 15 2003 with the number PI 0303138-1. Said lid 20 is obtained in a transparent or not transparent plastic material comprising a sealing portion 21 to be removably seated and retained in the seat 16, and presenting an external edge 21b which is seated on the 20 upper end 13 of the tubular body 10 of the can. The lid 20 further comprises, in a single piece with the sealing portion 21, a seal 25 having a lower skirt 25a generally tightly seated around the upper end 13 of the tubular body 10 and which presents an upper edge 25b which is incorporated, by means of manually 25 breakable bridges 26, to the external edge 21b of the sealing portion 21.

According to the present invention, the bridges 26 are ruptured when submitted to a certain pulling force for 30 separating the seal 25 from the sealing portion 21, when the lid 20 is opened for the first time.

According to the present invention, the sealing portion 21 incorporates a gripping tab 27 which is axially downwardly projected through an interruption 35 25c provided in the circumferential extension of the

seal 25, for example, remaining substantially leveled with the lower skirt 25a.

The seal 25 comprises at least one breakable lock 28 connecting the gripping tab 27 to the lower skirt 25a.

- 5 The gripping tab 27 is manually operable only when part of the seal 25 is ruptured, for example upon rupture of each breakable lock 28.

In the illustrated construction, the lower skirt 25a incorporates the ends of a seal bridge 25d 10 circumferentially extended over the interruption 25c of the seal 25 and over the gripping tab 27. The seal bridge 25d presents a first end 25e, which is incorporated to the lower skirt 25a by connecting means 25f, which are broken when said first end 25e is 15 forced away from the lower skirt 25a, in order to permit the manual access to the gripping tab 27. The gripping tab 27 is inferiorly incorporated to the seal bridge 25d by means of a breakable lock 28, in the form of one or more axial bridges which are manually 20 broken upon the first opening of the lid.

In the illustrated construction, the external edge 21b of the sealing portion 21 incorporates a small cylindrical lower rib 21c which involves, preferably tightly, a circumferential extension of the upper end 25 13 of the tubular body 10 and from which depend the bridges 26 inferiorly incorporated to the upper edge 25b of the lower skirt 25a.

It is also possible, as illustrated, for the lower skirt 25a to incorporate an internal circumferential 30 projection 25h, axially spaced from the external edge 21b of the sealing portion 21 and which is dimensioned to be seated and axially locked under the double seam 14 in the upper end 13 of the tubular body 10 and around the latter.

35 According to the invention, the upper end 13 of the

tubular body 10 is shaped to present a cross section contour that is smaller than the largest cross section contour of the tubular body 10, so as to prevent the mutual contact of the lids 20 with two adjacent cans  
5 disposed side by side.

In the illustrated preferred construction, the tubular body 10 presents an upper portion 10a which contains the upper end 13 of the tubular body 10 and which has substantially the same cross section contour as said  
10 upper end 13. Said upper portion 10a of the tubular body 10 presents a height or an extension that is larger than the height of the lower skirt 25a of the seal 25 of the lid 20. In the illustrated embodiment,  
15 the height of the upper portion 10a of the tubular body 10 is approximately twice the height of the lower skirt 25a of the lid 20.

The upper portion 10a of the tubular body 10 is inferiorly incorporated to a transition portion 10b, which presents a cross section profile defined by two  
20 upwardly converging straight line segments, said transition portion 10b uniting the upper portion 10a of the tubular body 10 to a basic portion 10c of the latter. In the illustrated embodiment, the basic portion 10c of the tubular body 10, defined below the  
25 transition portion 10b, presents a substantially constant cross section contour which is generally circular, said basic portion 10c being inferiorly limited by the lower end 11 of the tubular body 10.

The cross section contour of the basic portion 10c is  
30 substantially larger than that of the upper portion 10a, allowing the lid 20, more particularly its lower skirt 25a and its seal bridge 25d, to define a contour contained inside the cross section contour of the basic portion 10c.

35 As illustrated in figures 4 and 5, the construction

proposed by the present invention allows the contour of the lower end 11 of a tubular body 10 of a can to be sufficiently larger than the contour of the upper end 13, so as to be positioned external to the upper 5 end 13 of a tubular body 10 disposed immediately below, when the cans are stacked. With this construction, upon stacking the cans, the bottom wall 12 of a tubular body 10 is seated on the lid 20 of a tubular body 10 disposed immediately below in the 10 stack, guaranteeing a better distribution of the stacking load over the lid 20. The locking between the stacked tubular bodies 10 is made, by interference in the radial direction, between the lower end 11 of the upper tubular body 10 and the lower skirt 25a of the 15 lid 20 of the tubular body 10 disposed immediately below.

While the invention has been described in relation to a single constructive embodiment, it should be understood that changes could be made without 20 departing from the constructive concept defined in the appended claims.